BROADCAST tools INC

Installation and Operation Manual

Broadcast Tools® ACS 8.2 Plus

Eight Input, Dual Output Stereo Matrix Audio Control Switcher

Firmware Version 1.6 or above

Manual update 02/06/2015

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INTRODUCTION

Thank you for your purchase of a **Broadcast Tools® ACS 8.2 PLUS EIGHT INPUT, DUAL OUTPUT STEREO MATRIX AUDIO CONTROL SWITCHER** (referred to as the ACS 8.2 Plus throughout this manual). We're confident that this product will give you many years of dependable service. This manual is intended to give you all the information needed to install and operate the Broadcast Tools® ACS 8.2 Plus.

Broadcast Tools, Inc., is unable to support NON-Broadcast Tools hardware/software or NON-Broadcast Tools computer hardware/software problems. If you experience these problems, please research your hardware/software instruction manuals or contact the manufacturer's technical support department.

SAFETY INFORMATION

Only qualified personnel should install Broadcast Tools® products. Incorrect or inappropriate use and/or installation could result in a hazardous condition.

WHO TO CONTACT FOR HELP

If you have any questions regarding your product or you need assistance, please contact your distributor from whom you purchased this equipment.

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THANK YOU FOR CHOOSING BROADCAST TOOLS® BRAND PRODUCTS!

Designed and Assembled in Washington State, USA

CAUTION!

Broadcast Tools® Products, as with any electronic device, can fail without warning. Do not use this product in applications where a life threatening condition could result due to failure.

NOTE:

This manual should be read thoroughly before installation and operation.

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PRODUCT DESCRIPTION

The **Broadcast Tools® ACS 8.2 Plus** provides matrix audio switching of 8 stereo inputs to 2 stereo plus 2 mono outputs. Any input assigned to output one has fading capabilities. Matrix switching allows any/or all inputs to be assigned to any/or all outputs. The ACS 8.2 Plus may be controlled via front panel switches, contact closures, 5-volt TTL/CMOS logic and/or the multi-drop RS-232 serial port (control via USB or Ethernet with optional devices). Installation is simplified with plug-in euroblock screw terminals.

PRODUCT FEATURES

- True matrix switching, any or all inputs may be assigned to any or all outputs. Any input assigned to output one may be faded up, down or dimmed from either the front panel, contact closures, 5-volt TTL/CMOS logic or the multi-drop RS-232 serial port.
- Stereo LED VU meters with front panel output selection switch.
- Stereo headphone amplifier with front panel output selection switch, headphone jack and level control.
- Internal silence sensors monitor both output channels. Each is equipped with front panel LED indicators; separate SPDT SS alarm relays, adjustable alarm delay and restore duration.
- Front panel input selection switches are provided for each input channel with separate output indicator LED's
- Power-up selection of inputs to outputs, mute or last source selected.
- 16 input GPI port (PIP or Remote Control) with LED indicator.
- Eight open collector channel status outputs or programmable via burst commands.
- Eight SPDT relay outputs with multiplex function on output two. Programmable via burst commands.
- Optional AGC function on each output channel.
- Logic functions via microprocessor and non-volatile memory
- Most configuration options via rear panel dipswitches.
- Multi-turn input and output level controls.
- Electronically balanced stereo inputs.
- Electronically balanced stereo and monaural outputs.
- Multi-drop RS-232 serial port with data activity LED.
- Multiple units may be cascaded to expand inputs.
- 1-RU chassis.

FUNCTION DESCRIPTION

Front Panel:

The ACS 8.2 Plus is a 1-rack unit device (19"w x 1.75"h x 10"d). The front panel supports fourteen selection switches, 25 LED indicators, headphone and LED VU meter output selection switch, headphone jack and headphone level control.

Rear Panel:

Installation is simplified with euroblock pluggable screw terminals. The rear panel host's audio and control plug-in euroblock screw terminals, input/output trimmers, multi-drop RS-232 modular connector and 5-pin DIN power supply connector.

Switches:

The front panel of the ACS 8.2 Plus contains selection pushbuttons for each input channel. A mute switch is provided to turn off each audio channel. Fade up, down and dim push buttons are provided for inputs assigned to output one. A push-push switch is furnished for both VU meter and headphone monitoring selection. Input channels may be programmed for the following operations:

- Overlap (default) - Overlap one audio source with another while the button for the second source is held down. Both channels will be fed to the output until the second button is released, at which time the first audio source will be switched off.
- Mix – Multiple inputs at a time to any given output - Push once to connect input, press again while holding down the mute switch.
- Interlock - Connecting one input to any output disconnects all other inputs from that output.

LED Indicators:

The ACS 8.2 Plus's front panel LED indicators provide operational display of the following information:

- LED indicators for each input switch displaying which output channel the input is assigned.
- The mute indicator LED is lit when all channels are off.
- Two 10 - LED VU meters are selectable between output channels.
- Two "SS" LED's indicating when an output channel has drop below –37db.
- "PIP" Parallel Input Port (GPI) active, indicating any change with the 16 input GPI ports.
- "Pwr/Ser" LED which indicates valid power and will flash when the serial RS-232 port is receiving or transmitting serial data.
- Optional AGC LED's. Each output AGC module will drive two LED's indicating above/below the target level.

Controls:

- Headphone and VU meter monitor switch to select which output channel is monitored.
- Headphone jack
- Headphone level control
- Input, Output, Fade, Dim, Mute and Program push buttons

Audio Inputs:

Each of the 8 stereo inputs are balanced bridging (20KΩ) at a nominal line level of +4dBu. Multi-turn level controls are provided for each channel.

Audio Outputs:

The ACS 8.2 Plus provides two selectable balanced stereo outputs. Two balanced monaural outputs are also provided which follow their respective stereo outputs. The stereo outputs are adjustable.

Stereo 10 – LED VU Meters:

The ACS 8.2 Plus contains LED VU meters selectable between the two output channels.

Silence Sensors:

Each output channel has a detector that monitors the sum of each stereo channel. The factory default delay is set at 10 seconds, with a threshold of -37 dB, while the restore time is set at 10 seconds. Upon silence delay detection, the "SS-1 or SS-2" SPDT relays close for the duration of the silence and the corresponding (SS-1 or SS-2) LED is lit for duration of silence. Serial data is sent on either the loss or restoration of audio. The sensor may be programmed for:

- Number of seconds of silence that must be present before an alarm state is reached.
- Number of seconds that valid audio must be present before an alarm state is cleared (Restore).

Remote Control (GPI) Inputs:

Most front panel functions may be controlled with the 5-volt TTL/CMOS logic compatible, contact closure inputs.

PIP (GPI) Inputs:

The Parallel Input Port provides 16 parallel 5-volt TTL/CMOS logic compatible GPI inputs. The inputs are pulled high to 5 volts through a 20KΩ resistor and are activated by pulling the input to ground. These inputs supply status to any serial polling device (when the unit ID is set to 0, no polling of inputs is required).

"Open Collector" Status Outputs, 8 Port Output Control

The ACS 8.2 Plus provides eight open collector status outputs. The status outputs may be configured to operate in one of three modes:

- The status output follows the associated channel (multiplex applications).
- The status outputs a one-second pulse when the associated channel is selected.
- Software Control.

Relay Outputs, 8 Port Output Control:

The ACS 8.2 Plus contains 8 - SPDT relays. Each relay may be latched on, latched off or momentarily turned on by a non-dedicated computer. The "pulse" time may be set from 100msec to 9.9 seconds. The default pulse length is one-second.

8 SPDT relay outputs may be controlled by software. Each relay may be commanded to:

Latch On	Turns on and stays on (through power failures) until turned off.
Latch Off	Turns off and stays off (through power failures) until turned on.
Momentary On	Overrides latch; turns on for (default) second, then latches off.

Multiplex "MPX" NON-software control. SW17-9 must be ON. Each relay follows the associated input channel selected to output two only.

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FUNCTION DESCRIPTION

Front Panel Switches:

Switch(es)	Function
8, 1 for each input	Input Channel 1 - 8.
Mute	Mute either or both outputs. when used w/ an input switch
OP 2	Used to select any of the inputs to output two.
Dim	* Dim audio on the selected input to a pre-programmed amount.
Fade Up	* Fade up the selected input audio channel 1 to a pre-programmed time.
Fade Down	* Fade down the selected input audio channel to a pre-programmed time.
Hidden “PGM” switch	To program the configurations

* When assigned to output one only.

ACS 8.2 Plus Front Panel switch operation	
Action	Result
Push any channel button.	Channel is connected to output 1. To mute the active channel, simultaneously hold down the mute switch while pressing the input push button.
Press and hold the output 2 push button while selecting any input button.	The input channel is connected to output 2. To mute the active channel, simultaneously hold down the output 2 and mute switch while pressing the input push button.
Push any input channel while holding down the “Fade up” button.	The selected input will be faded up at the selected rate on output 1 only.
Push any input channel while holding down the “Fade down” button.	The selected input will be faded down at the selected rate on output 1 only.
Push any input channel while holding down the “Dim” button.	The selected input will be dimmed to the selected level on output 1 only.

FUNCTION DESCRIPTION

Front Panel LED's (Left to Right):

Front Panel LED's	Number Of LED's	Activation Event/Mode	Activation Behavior
Inputs connected to "OUTPUT 1"	8 Green	State of Connection	On if connected to Output 1
Inputs connected to "OUTPUT 2"	8 Red	State of Connection	On if connected to Output 2
"Mute"	1 Red	System Mute Status	On when both output channels are off.
Optional AGC Output 1	1 Green 1 Red	AGC Action	Red if above, green if below target level
Optional AGC Output 2	1 Green 1 Red	AGC Action	Red if above, green if below target level
"SS-1", Silence Alarm for output 1	1 Red	Duration of Silence	On if alarmed
"SS-2", Silence Alarm for output 2	1 Red	Duration of Silence	On if alarmed
"PIP" Pulse Active	1 Yellow	Any valid GPI input when enabled	Flickers when a PIP is detected
"Pwr/Ser" Status	1 Green	Valid Power and/or serial data.	On w/ valid power & flickers w/ serial data.

INSTALLATION GUIDLINES

Inspection:

Please examine your ACS 8.2 Plus carefully for any damage that may have been sustained during shipping. If any is noted, please notify the shipper immediately. Retain the packaging for inspection by the shipper. The package contains the ACS 8.2 Plus, power transformer, installation manual and a reversed modular serial cable with a (S9) 9-pin D-Sub adapter.

User Programming:

The ACS 8.2 Plus programming is stored in non-volatile memory. Configurations are set with selection dipswitches and menu or burst commands.

Setting Operation "DIP" Switches:

The ACS 8.2 Plus is equipped with a 10-position "PGM" (SW17) dipswitch. The dipswitch specifies audio modes (mix, interlock, overlap), 2 bit unit ID, baud rate and other features listed below. Access to this switch is near the front panel. Follow the description below.

INSTALLATION GUIDELINES

DIP (SW-17) "PGM" Switch Functions

Switch Number	Default Setting	Function
1	OFF	Add 1 to Address (Default ID = 0 to access menu)
2	OFF	Add 2 to Address
3	OFF	Baud rate (Default = 9600)
4	OFF	Baud rate
5	OFF	Stereo Audio Switching (Default = Overlap)
6	OFF	Stereo Audio Switching
7	OFF	Power up modes (Default = Save selection via "PGM" button)
8	OFF	Open collectors in remote mode. (Default: Follow)
9	OFF	Output 2 "MPX" mode
10	OFF	Remote Control (Default) / PIP/GPI

Address (ID) DIP Switches

SW17-1	*SW17-2*	*Mode*
OFF	OFF	ID = 0
ON	OFF	ID = 1
OFF	ON	ID = 2
ON	ON	ID = 3

Baud Rate DIP Switches

SW17-3	*SW17-4*	*Mode*
OFF	OFF	9600
ON	OFF	2400
OFF	ON	19200
ON	ON	38400

Audio Switch Mode DIP Switches

SW17-5	*SW17-6*	*Mode*
OFF	OFF	Overlap
ON	OFF	Interlock
OFF	ON	Interlock
ON	ON	Mix

INSTALLATION GUIDELINES

Power up Mode DIP Switches

SW17-7	*Function*
OFF	Front Panel "PGM" Switch
ON	Last Source Selected

Power-Up Feature:

Refer to the DIP Switch SW17-7 to select which power up feature. If SW17-7 is OFF, follow the steps below:

1 – Select the input/output configuration required at power up.
2 – Find the hole to the left of the "hdph lvl" knob and stick a non-metallic object into the hole until you feel the switch engage.
3 – When the switch has been engaged, the 16 input LED's will blink indicating the power up selection has been programmed.

With SW17-7 ON, The last source selected will be remembered at power up.

Open collector Mode DIP Switches

SW17-8	*Function*
OFF	Open Collectors follow inputs (OP-1)
ON	Open collectors under software control

Output 2 "MPX" Mode DIP Switches

SW17-9	*Function*
OFF	Relays under software control
ON	Relays under "MPX" mode (OP-2)

PIP/Remote Control Mode DIP Switches

SW17-10	*Function*
OFF	Remote Control
ON	PIP enabled

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INSTALLATION GUIDELINES

Mounting:

The ACS 8.2 Plus is designed to be rack mounted in a standard 19" rack. It should be mounted in an area that is accessible from the rear and preferably away from sources of heat. We recommend before permanently installing the ACS 8.2 plus, you bench test and become familiar with the operation of the unit.

Power Supply Connection:

Install the 5-pin DIN power connector into the power receptacle on the ACS 8.2 Plus. When ready, plug the power supply into the appropriate AC receptacle.

Connecting the Audio Inputs, Outputs, Status Inputs and OC/Relays:

The input channels are numbered from 1 through 8 on the rear panel from left to right. The ACS 8.2 Plus interfaces to your audio equipment through plug-in euroblock screw terminals. Follow the legends for the desired audio input and output connections, which appear on the rear side of the printed circuit board and also on the layout drawing on the last page of this manual. Remove each screw terminal, strip each conductor, insert the conductor into the terminal and screw down the capture screw. The terminals accommodate wire sizes from 16 - 28 AWG solid or stranded wire. Connections may be made to the + and - inputs for balanced operation, or to the + input and grounding the - side for unbalanced input operation. Connections can be made to the + and - outputs for balanced operation, or to the + output and ground for unbalanced output operation.

It is recommended that all cables connected to the ACS 8.2 Plus be looped through ferrite cores to suppress RF. Surge protection with RF filtering is also suggested for the power transformer. The purchase of an inexpensive uninterruptible power supply (UPS) will provide back up in case of power outages.

Adjusting Input and Output Levels:

Calibrating audio levels on the switcher and VU meters:

1 - Remove power from the unit.
2 - Remove the cover.
3 - Feed a reference signal into the selected input channel.
4 - Connect a Hi Z dB meter to the TEST jack TB9
5 - Reapply power.
6 - Adjust the left and right input to a zero level on your dB meter.
7 - Adjust the VU trimmers R126 (left) and R133 (right) for zero VU.
8 - Now the output trimmers may be used to set the desired output levels.

NOTE: The rest of the inputs may be adjusted.

CAUTION!

In no case should either the + or - outputs be connected to ground.

The input impedance is 20KΩ, 600Ω termination may be installed on the connector.

CAUTION!

Installation of the ACS 8.2 in high RF environments should be performed with care. Shielded cable is suggested for all control, audio inputs and outputs. All shields should be tied to the "CH GND" terminal on each channel. The station ground should be connected to the chassis ground screw (CH1) located behind J1 as viewed from the rear. For lightning protection devices, check out www.polyphaser.com and www.itwlinx.com.

INSTALLATION GUIDELINES

Input Channel Expansion:

Input expansion may be accomplished by connecting a shielded cable between the first units EXT 1+ input terminal and the second units + unbalanced output (1/2 of the balanced output). The shield should be connected to the ground terminal. Follow the same procedure for the EXT +1 right channel. The above example provides 16 inputs, with the first ACS 8.2 Plus providing the main output.

Remote Control:

Most front panel functions of the ACS 8.2 Plus may be remote controlled via plug-in euroblock screw connectors located on the rear panel. The ACS 8.2 Plus accepts momentary contact closures, open collector or 5-Volt TTL/CMOS logic levels. Open collector status/tally is also provided and follows the action of the front panel LED's. Refer to the connector layout on page 18 of this manual. If the ACS 8.2 Plus is to be used as a switcher in an automation system, these same inputs (PIP) can monitor external contacts and convert these contacts to serial strings used by most automation systems.

Serial Interface:

The multi-drop RS-232 transceiver is always in a listening mode unless selected or the unit ID is zero. In that case, the unit will always leave the RS-232 transceiver enabled. This is the correct setting for a single unit controlled via RS-232 and the only way to access the menu.

Connecting the RS-232 Serial Port:

Use the provided modular (S9) 9-pin D-sub connector adapter and reversed modular cable to connect the ACS 8.2 Plus's serial connector to your serial port.

The multi-drop RS-232 transceiver is always in a listening mode unless selected or the unit ID is zero. In that case, the unit will always leave the RS-232 transceiver enabled. This is the correct setting for a single unit controlled via RS-232 and the only way to access the menu.

NOTE:

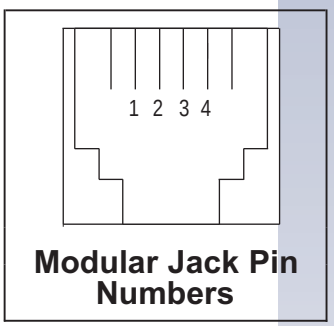
Find step by step HyperTerminal setup instructions at www.broadcasttools.com under downloads.

INSTALLATION GUIDELINES

Serial Interface:

The pin out of the adapter is shown below.

RJ-11 Adapter Pin	DB-9 D-Sub	ACS 8.2 Plus (Point of view)
4	3	RS-232 Receive
3	2	RS-232 Transmit
2	5	Ground



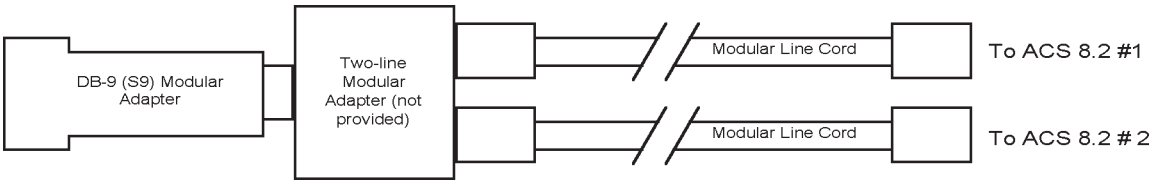
Modular Jack Pin Numbers

The ACS 8.2 Plus is supplied with a reversed 4 conductor modular cable and a (S9) 9-pin D-connector modular adapter for serial control. Only use the reversed modular cord that is supplied with the ACS 8.2 Plus or a replacement that reverses, such as Radio Shack Cat No. 2790347. Connect the cable between the ACS 8.2 Plus and your computer. The ACS 8.2 Plus may operate at baud rates from 2400 to 38400 baud. The unit is shipped set for 9600 baud, with 8 data bits, no parity and one stop bit. Load Windows HyperTerminal using the protocol of 9600-N-8-1. Set the mode to: DIRECT, Flow Control to: NONE and emulation to: ANSI.

Connecting Two ACS 8.2's to a Single Computer's Serial Port:

Multiple ACS 8.2 Plus's may be cascaded serially to operate from the same serial port. The first step is to assign ID's to each ACS 8.2 Plus. One suggestion is to assign 1 to the first ACS 8.2 Plus and 2 to the second switcher. The second step is to parallel the serial ports of the ACS 8.2 Plus's. Plug the male end of the duplex modular adapter into the supplied female (S9) DB-9 to RJ-11 adapter, then attach the supplied reversed modular line cords into each of the duplex modular adapter receptacles (Radio Shack Cat No. 279-0357) and the other ends into each ACS 8.2 Plus modular receptacles. See the diagram below.

NOTE: Three or more ACS 8.2 Plus's may be daisy chained by using the above description and a Radio Shack Cat No. 279-0410, 5-jack modular adapter.



Serial Control:

The unit is controlled in either Menu or Burst mode. The ACS 8.2 can operate at the following data rates:

2400; 9600 Default; 19,200; 38,400

Serial communications is multi-drop RS-232. Commands may be entered either via a menu (menu mode for unit ID 0 only) or a short form code (burst mode). All commands and responses use normal ASCII characters, facilitating scripting.

INSTALLATION GUIDELINES

Menu Mode:

The command to enter menu mode starts with an asterisk ("*") followed by the device ID (0, ONLY) address as a single decimal digit, then the MM command. NOTE: Commands typed will NOT be seen, unless you turn "Echo ON" in HyperTerminal. The menu mode displays advanced configuration parameters. Unit ID, Baud rate and other configurations are set via the on-board dipswitches (SW 17) at the front of the unit.

NOTE: The cover must be removed, to gain access to the Dipswitches.

Broadcast Tools® ACS 8.2 Plus, v1.8 - Menu

1 - PIP Min 0-2.55 sec	**Now: 0.02 (sec)**
2 - O.C. Mode	**Now: "Follow"**
3 - SS Delay Time (sec)	**Now: 10**
4 - SS Restore Time (sec)	**Now: 10**
5 - Dim (DB)	**Now: -10**
6 - Fade (sec)	**Now: 5**
7 - Relay Pulse (sec)	**Now: 1.0**

Serial Burst Mode Commands:

Burst mode allows a computer or ASCII terminal to control and interrogate the unit. This section defines all burst mode commands. Each burst mode command starts with an asterisk ("*"). Next is a single decimal digit that corresponds to the unit (ID) address 0-3. Following that are one or more ASCII characters specifying the command. No carriage-return or line-feed is required to terminate the command except for those few commands of variable length, if the maximum length is not sent. If acknowledgements are enabled, successful commands are responded to with "RRR" while errors get an "EEE" response. The syntax of each command is given below. The syntax shows the command exactly as it should be sent, except that lower case characters represent values that should be substituted.

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INSTALLATION GUIDELINES

Glossary Of Command Notation:

Character String	Meaning	Allowable Values
u	Unit ID	0-3
ii	Input Number	01-08
o	Output Number	1-2
r	Output Relay	1-8
r	Open Collector	1-8

Set-up Commands:

*uMM - Open up Menu

*uC4x - Set RS-232 mode timings: x = 1, Turn ON RS-232 mode NO delays on sending data. x = 0, Turn OFF RS-232 mode (delay for RS-232 charge pump startup before sending response, unless ID = 0).

*uCCx - Set Serial Speed. See dipswitch SW17-3 & 4.

*uCEx - Enable Error and Good Responses - Where x = Y to enable and N = disable. In this mode, when a command is sent that is in error, the unit will reply (possibly before receiving the entire command) with "EEE." If the command is sent correctly, the unit will reply with "RRR."

*uCDEF - Set factory defaults.

*uCIIttt - Set "PIP" Programmable Pulse Stretcher Input Duration = ttt: 000 –> 255 hundredths of seconds (255 = 2.55 Seconds)

*uCIOiittt - Ignore, send OK

*uCLx - Lock Front Panel if x is "L". Unlock Front Panel if x is "U"

*uCPR - Power up audio state: Restore audio from power up state

*uCPS - Power up audio state: Save power up state

*uCRtt - Set Relay/OC momentary Pulse Length – tt: 00-99 for 00 –> 9.9 Seconds

*uCSAtttt - Set silence sensor time delay to tttt seconds (0002 – 9999), 0000 = OFF

*uCSBtttt - Set silence sensor restore delay to tttt seconds (0002 – 9999), 0000 = OFF

*uCSDttt - Ignore, send OK

*uCST - Ignore, send OK

*uCSVttt - Ignore, send OK

INSTALLATION GUIDELINES

Relay and Open Collector Commands:

*uORrF - Unlatch output relay "r"
*uORrL - Latch output relay "r"
*uORrP - Pulse output relay "r"
*uOOoF - Unlatch open collector "o" (With DIPswitch 17-8 ON)
*uOOoL - Latch open collector "o" (With DIPswitch 17-8 ON)
*uOOoP - Pulse open collector "o" (With DIPswitch 17-8 ON)

Audio Switch Control Commands:

*uiio - Apply input "ii" to output "o"
*uiiA - Apply input "ii" to ALL outputs
*uiiEott - Start overlap – Apply input ii to output o. After tt tenths of a second, remove all other inputs from output o.

NOTE: Only one at a time can be pending per output. Max time 9.9 seconds

*uE - End overlap if in overlap mode. This applies to all outputs that have changed since the last "end overlap" command was issued.
*uB,a,a,a,a,a,a,a,a - Sets inputs, ignoring mode: NOTE: Input commands MUST be in CAPS.

- A = All "OUTPUTS" OFF
- B = Output 1
- C = Output 2
- D = Outputs 1 + 2

Example: *0B,B,C,D,A,A,A,A,A (Input 1 to output 1, Input 2 to output 2, Input 3 to both outputs, all other inputs are OFF.

*uii3 - For input "ii", set output 1 on without affecting any other audio status
*uii4 - For input "ii", set output 2 on without affecting any other audio status
*uii5 - For input "ii", set output 1 off without affecting any other audio status
*uii6 - For input "ii", set output 2 off without affecting any other audio status
*uFDnn - Fade down input nn. The speed is set via the menu.
*uFUnn - Fade up input nn. The speed is set via the menu.
*uDMnnd - DIM input channel nn to setting d.

1 = 3db, 2 = 6db, 3 = 10db, 4 = 15db, 5 = 20db.

Example: *0DM013 This would dim channel 01 on unit 0, 10db below set level.

*uiiMA - Mute input "ii" for all outputs
*uiiMo - Mute input "ii" for output "o"
*uMo - Mute output "o"
*uMA - Mute all outputs

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Information Retrieval Commands:

*POLL - Respond with unit (ID) address in appropriate time slot. If there are multiple units on the line, each will respond with a different delay after receipt of this command.

*uSA - Ignore, Send OK

*uSL - Send Audio Status: SuLo,x,x,x,x,x,x,x,x<CR><LF>. "u" is unit ID, "o" is output, and "x" is "1"for connected; "0" for not connected for each respective input. Example: "S1L2,1,0,1,0,0,0,0,0<CR><LF> says that unit 1, output 2 is connected to inputs 1 and 3.

*uSPii - Send single input (GPI) PIP status. Response is "SuP,ii,x" where "x" is 1 if the corresponding input is high, 0 otherwise.

*uSPA - Send ALL input (GPI) PIP status. Response is: "SuP,A,x,x,x,x,x,x,x,x,x,x,x,x,x,x,x<CR><LF > where input 0 is first and input 15 is last. "x" is 1 if the corresponding input is high, 0 otherwise.

*uSO - Send status of all Open Collectors. Response is: SuO,x,x,x,x,x,x,x,x<CR><LF>

*uSR - Send status of all relays. Response is: SuR,x,x,x,x,x,x,x,x<CR><LF>

*uSS - Send status of silence sensors. Response is "SuS,a,b <CR><LF>

a = Output 1 / b is Output 2. 1 = Not silent, 0 = Silent.

*uU - Send Unit Information:<name(ACS 8.2C)><version><cr><lf

*uY - Display configuration

Real Time Control Commands:

*uDxx - Delay xx seconds before processing next command.

*uDLxxx - Delay xxx seconds before processing next command.

*uZx - Echo character "x" to serial control port. This is useful in debugging command strings.

WEBSITE:

Visit our web site for product updates and additional information.

INSTALLATION GUIDELINES

NOTE: Refer to the assembly drawing in the appendix for all rear panel connectors and trimmers.

Audio and remote connections:

TB 1 --> TB 4 ***EVEN*** **Inputs** **Top Row**

Input x – Left	Input x + Left	Gnd	Input x – Right	Input x + Right
Input x – Left	Input x + Left	Gnd	Input x – Right	Input x + Right

ODD Inputs **Bottom Row**

TB 5 **Output Two** **Top Row**

Output 2 – Left	Output 2 + Left	Gnd	Output 2 – Right	Output 2 + Right
Output 1 – Left	Output 1 + Left	Gnd	Output 1 – Right	Output 1 + Right

Output One **Bottom Row**

TB 6 **Monaural Output** **Top Row**

Output 1 –	Output 1 +	Gnd	Output 2 –	Output 2 +
Ext 1 Input Left +	Ext 1 Input Right +	Gnd	Ext 2 Input Left +	Ext 2 Input Right +

External (Expansion) Inputs **Bottom Row**

TB 7 The bottom connector has two functions, depending on the position of **SW17-10**

Left hand 16-position connector on the rear of the switcher.

K 1 N.O.	K I Com	K 1 N.C.	K 2 N.O.	K 2 Com	K 2 N.C.	K 3 N.O.	K 3 Com	K 3 N.C.	K 4 N.O.	K 4 Com	K 4 N.C.	K 5 N.O.	K 5 Com	K 5 N.C.	Gnd	***Top Row***
PIP1	Gnd	PIP2	PIP3	Gnd	PIP4	PIP5	Gnd	PIP6	PIP7	Gnd	PIP8	PIP9	Gnd	PIP10	PIP11	**SW17-10 ON** ***Bottom Row***
In 1 to 1	Gnd	In 2 to 1	In 3 to 1	Gnd	In 4 to 1	In 5 to 1	Gnd	In 6 to 1	In 7 to 1	Gnd	In 8 to 1	Pgm	Gnd	Mute	Sel OP-2	**SW17-10 OFF** ***Bottom Row***

INSTALLATION GUIDELINES

Remote Control operation:

To select input one to output one, bring In1 to Op1 to Gnd.
To select In1 to Op2, bring OP-2 to Gnd, then bring In1 to Op1 to Gnd.
NOTE: Dipswitch SW17-10 must be OFF.

TB 8 The bottom connector has two functions, depending on the position of **SW17-10**

Right hand 16-position connector on the rear of the switcher.

K 6 N.O.	K 6 Com	K 6 N.C.	K 7 N.O.	K 7 Com	K 7 N.C.	K 8 N.O.	K 8 Com	K 8 N.C.	SS-1 N.O.	SS-1 Com	SS-1 N.C.	SS-2 N.O.	SS-2 Com	SS-2 N.C.	Gnd	***Top Row***
Gnd	PIP12	PIP13	Gnd	PIP14	PIP15	Gnd	PIP16	OC1	OC2	OC3	OC4	OC5	OC6	OC7	OC8	**SW17-10 ON** ***Bottom Row***
Gnd	Dim	Fade Up	Gnd	Fade Down	Open	Gnd	Open	OC1	OC2	OC3	OC4	OC5	OC6	OC7	OC8	**SW17-10 OFF** ***Bottom Row***

NOTE:

Non-mechanical latching relays. When power is removed, each relay will open. When power is restored, each relay will return to the pre-power failure state.

NOTE:

In burst mode, momentary timing on each relay can be set from .1 to 9.9 seconds.

BROADCAST TOOLS ® ACS 8.2 PLUS SPECIFICATIONS

* Audio Precision Test Equipment

Input Levels: Max + 27 dBu, balanced, bridging.> 20k Ω.

Output Levels: Stereo balanced outputs 1 & 2, +24 dBm. @ 600 Ω. / +27dbu @ 10KΩ
Monaural balanced outputs 1 & 2, +24 dBm. @ 600 Ω. / +27dbu @ 10KΩ
Headphone output, +4 dBm @ 47 Ω.

Gain: 6 dB.

Frequency Response: * 20 to 20 kHz; +/- .0.25dB

Signal/Noise Ratio: * >85 dB nominal, weighted 20 to 22Khz, @ +27dBu.

Distortion: * Less than 0.01% THD @ +27dBu.

IMD (250/7kHz): * Less than 0.01% IMD @ +27 dBu.

Crosstalk: * -80 dB @ 1khz / -55 dB @ 10 kHz from adjacent off channel.

Mix Input: Unbalanced summing inputs @ 10k Ω, 0 dBu.

Switching Method: Digitally controlled professional level analog switch arrays and DAC's.

Logic: Microprocessor / Non-volatile memory.

Operation Control: Front Panel - Momentary switches.
Remote – Momentary (>100ms) compatible with 5 volts CMOS/TTL logic, open colletor or contact closures to ground.
RS-232 - Multi-drop RS-232, 2400, 9600, 19200, 38400 8,N, 1.

Status/Control: Front Panel - LED indicators.
Control - 8 - SPDT Relays / Silence Sensors - 2 – SPDT (1 amp).
Remote - 8 - Open collector outputs. 5 - 6 vdc @ 500 ma total.
RS-232 - Multi-drop Serial 2400, 9600, 19200, 38.400 baud, 8N1.

Interfacing: Audio & Remote Control - Rear panel plug-in euroblock screw terminals. Accommodates 16 – 28 AWG wire. Mating connectors supplied.

RS-232 Serial - RJ-11/6P4C Reversed modular cable & S9, DB-9 female adapter supplied.

Power: Universal AC (100 - 240 VAC, 46 - 63 Hz) switching power supply w/IEC input, multi-voltage (+5VDC & +/-15VDC) output. CE. Supplied with domestic IEC AC cord.

Mechanical: 19" x 1.75" x 10.0" (WHD) / Weight: 5.0 lbs.

Options: Smart USB to RS-232 Serial adapter cable.

LIMITED WARRANTY

The term "Buyer" as used in this document refers to and includes both (but only) (a) any person or entity who acquires such an item for the purpose of resale to others (i.e., a dealer or distributor of an item), and (b) the first person or entity who acquires such an item for such person's or entity's own use.

Broadcast Tools warrants to each Buyer of any item manufactured by Broadcast Tools that the item will be free from defects in materials and workmanship at the time it is shipped by Broadcast Tools if the item is properly installed, used and maintained.

EXCLUSIVE REMEDIES

If Broadcast Tools is notified, in writing, of a failure of any item manufactured by Broadcast Tools to conform to the foregoing Limited Warranty within one (1) year following the date of the Buyer's acquisition of the item, and if the item is returned to Broadcast Tools in accordance with Broadcast Tools' instructions for confirmation by inspection of the defect (which at Broadcast Tools' election may include, without limitation, a requirement that the Buyer first obtain a Return Authorization number from Broadcast Tools, that the Buyer furnish proof of purchase in the form of an invoice and/or receipt, and that the Buyer prepay all freight charges associated with any return of the item to Broadcast Tools using such freight service as Broadcast Tools reasonably may specify), Broadcast Tools will repair or replace the defective item, or will refund the purchase price paid by the Buyer for the item. Broadcast Tools shall have the exclusive right to choose between these alternative remedies.

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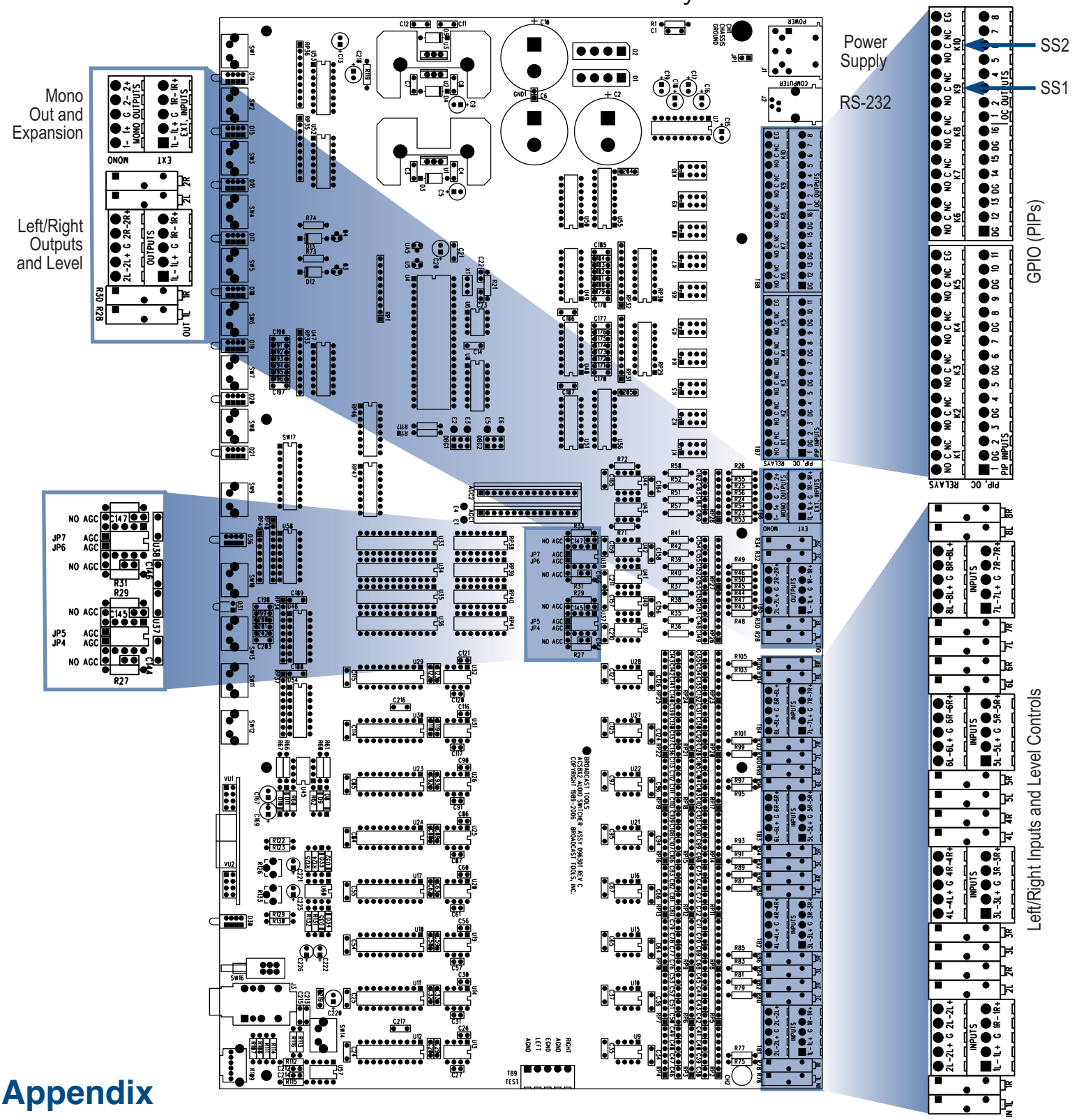
Broadcast Tools® ACS 8.2 Plus Audio Switcher

Trimmers and Connectors Layout



Appendix

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